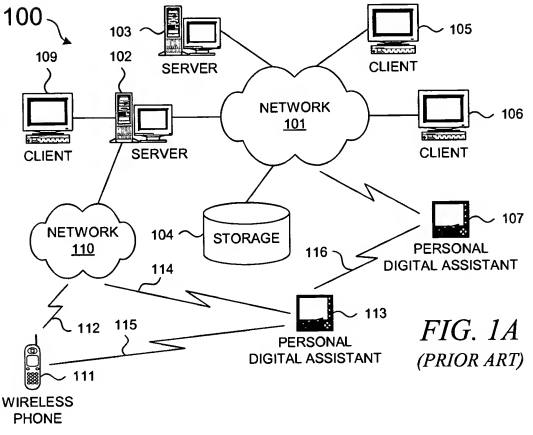


FIG. 1A
(PRIOR ART)

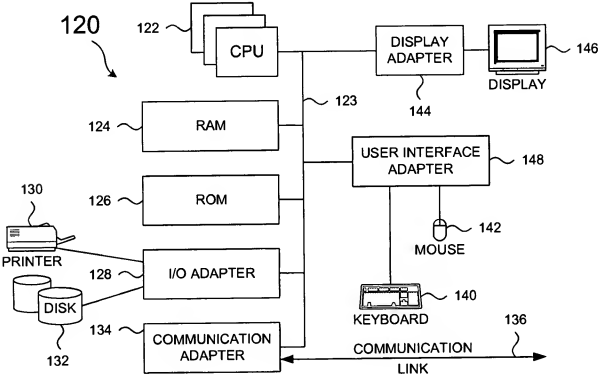


FIG. 1B
(PRIOR ART)

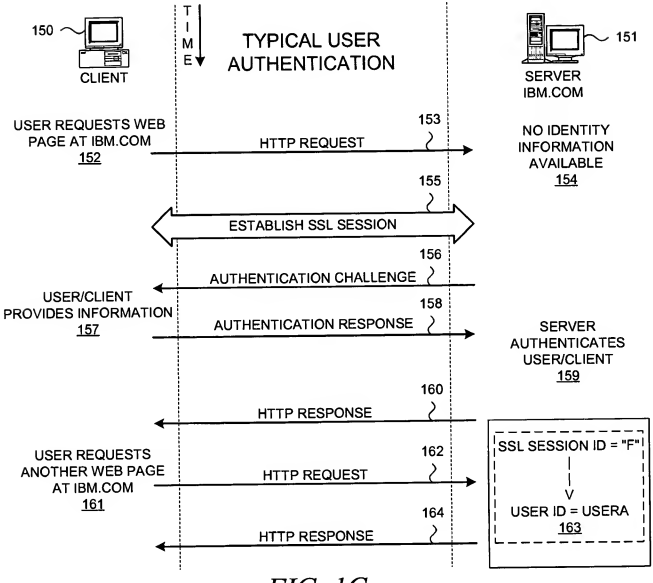
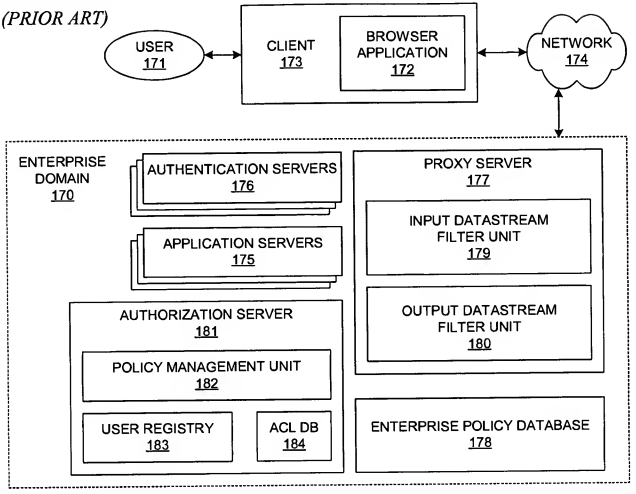


FIG. 1C
(PRIOR ART)

FIG. 1D
(PRIOR ART)



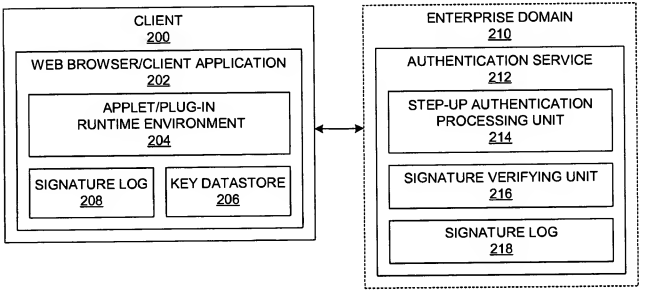


FIG. 2

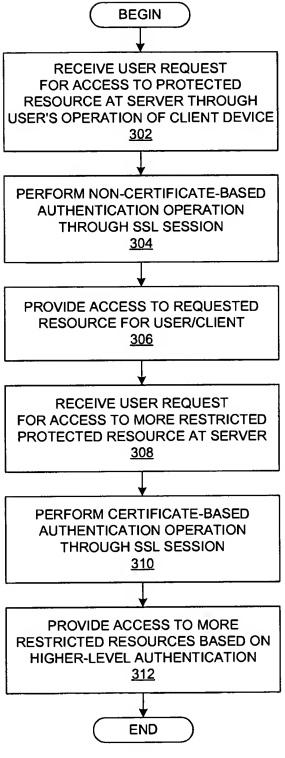

BEGIN
RECEIVE USER REQUEST FOR ACCESS TO PROTECTED RESOURCE AT SERVER THROUGH USER'S OPERATION OF CLIENT DEVICE 302
PERFORM NON-CERTIFICATE-BASED AUTHENTICATION OPERATION THROUGH SSL SESSION 304
PROVIDE ACCESS TO REQUESTED RESOURCE FOR USER/CLIENT 306
RECEIVE USER REQUEST FOR ACCESS TO MORE RESTRICTED PROTECTED RESOURCE AT SERVER 308
PERFORM CERTIFICATE-BASED AUTHENTICATION OPERATION THROUGH SSL SESSION 310
PROVIDE ACCESS TO MORE RESTRICTED RESOURCES BASED ON HIGHER-LEVEL AUTHENTICATION 312
END

FIG. 3

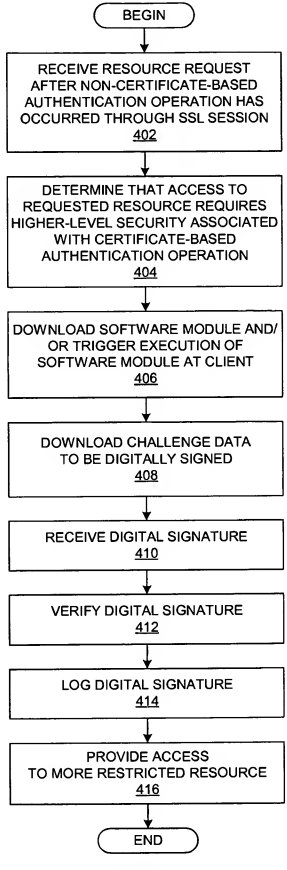

BEGIN
RECEIVE RESOURCE REQUEST AFTER NON-CERTIFICATE-BASED AUTHENTICATION OPERATION HAS OCCURRED THROUGH SSL SESSION 402
DETERMINE THAT ACCESS TO REQUESTED RESOURCE REQUIRES HIGHER-LEVEL SECURITY ASSOCIATED WITH CERTIFICATE-BASED AUTHENTICATION OPERATION 404
DOWNLOAD SOFTWARE MODULE AND/ OR TRIGGER EXECUTION OF SOFTWARE MODULE AT CLIENT 406
DOWNLOAD CHALLENGE DATA TO BE DIGITALLY SIGNED 408
RECEIVE DIGITAL SIGNATURE 410
VERIFY DIGITAL SIGNATURE 412
LOG DIGITAL SIGNATURE 414
PROVIDE ACCESS TO MORE RESTRICTED RESOURCE 416
END

FIG. 4

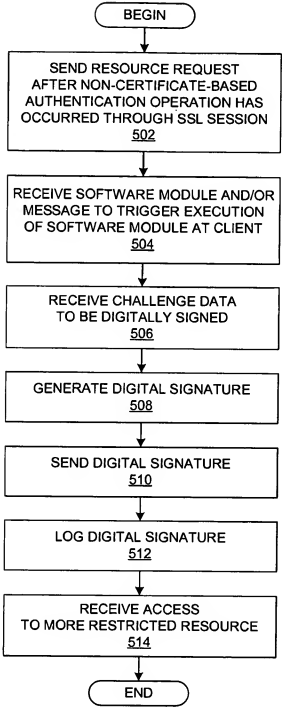

BEGIN
SEND RESOURCE REQUEST AFTER NON-CERTIFICATE-BASED AUTHENTICATION OPERATION HAS OCCURRED THROUGH SSL SESSION
502
RECEIVE SOFTWARE MODULE AND/OR MESSAGE TO TRIGGER EXECUTION OF SOFTWARE MODULE AT CLIENT
504
RECEIVE CHALLENGE DATA TO BE DIGITALLY SIGNED
506
GENERATE DIGITAL SIGNATURE
508
SEND DIGITAL SIGNATURE
510
LOG DIGITAL SIGNATURE
512
RECEIVE ACCESS TO MORE RESTRICTED RESOURCE
514
END

FIG. 5